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MEMOIR
ON
USEFUL GRASSES,

BY
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COMMUNICATED BY
DR. DAVENPORT.



Read on Monday, March 6th, 1809.

THE branch of botanical knowledge which is limited to the natural history of the grassy tribe, bears but a very small proportion to the immense field included within the insatiable grasp of the modern professors of that science; who count upon their catalogue 80,000 different plants, while they suppose the grasses taken by themselves amount only to 150.

An attempt, therefore, to reduce that comparatively small number still lower, and to bring the attention of the ROYAL IRISH ACADEMY upon a portion of it, not exceeding the tenth or twelfth part of the whole number of grasses, will probably excite surprise.

My object, however, will, I hope, plead my excuse: I have no other view than to be *practically* useful, and to assist the Agriculturist in selecting such grasses as, from some

years' diligent attention to the subject, I know will repay his labour in their cultivation.

Of these few, and of these only, I shall proceed to detail the NATURAL HISTORY, the QUALITIES, the HABITS, and the USES; previously taking the liberty to make some general observations on the subject.

In studying the œconomy of Nature in her three separate kingdoms, the ANIMAL, VEGETABLE, and MINERAL, according to the distribution of ARISTOTLE, we find her principle of arrangement perpetually counteracted by Man; who cannot, in any one of these kingdoms, avail himself of her bounty without exerting himself to undo what she has done.

The principle of Nature seems to be, to *mix* every thing; while Man, before he can *use*, must *separate*.

In the mineral kingdom, we scarcely know a distinct homogeneous material: every thing is a compound, and should the metals be quoted as exceptions, yet we rarely find even these in their distinct metallic form.

Hence the necessity for chemical ingenuity. Man wishes to make his use of the component parts separately, and the chemist, by his *analysis*, reduces the mass into its constituent elements.

In the animal kingdom, Nature throws all her subjects together indiscriminately, notwithstanding obvious incompatibilities; yet still, when left to herself, preserving all her species; compensating weakness and inability to resist, by facilitating
means

means of escape, and bestowing superior powers of propagation.

In this state, Man would derive little benefit from the numerous tribes surrounding him, his person even would not be secure. He has therefore exerted himself perseveringly from time immemorial; he has waged a destructive war against the most formidable, to their extermination, or, at least, the expulsion from his dominions of some species; and, where a milder disposition enables him, he has domesticated others; thus reducing the free denizens of nature to a small number.

In the vegetable kingdom, he has pursued nearly the same line and with the same industry; he has discovered and selected those adapted to his use, and has exerted his ingenuity in finding out how that use may be most effectually obtained.

What is Agriculture but the SCIENCE of cultivating *exclusively*, and to the best advantage, such grains or vegetables as are necessary to the sustenance of man or his domestic animals? His general process is simple: he gives the selected grain exclusive possession of his ground, first exterminating all rivals, and then wages unremitted war against all competitors that Nature, according to her invariable practice, persists in obtruding on him.

By the continuation of this process for some thousand years, and by perpetually sowing his *domesticated* seed, (as I may call it) Man has done more than he expected, as he has actually improved the species. For who can doubt that our grains

are meliorated since the days of TRIPTOLEMUS, when we see that, by skilful attention, our fruits and culinary vegetables are improved in our day?

To the grassy tribe, Man has not been so attentive. Grass has very rarely been a *primary* object with him; even when he sows it, he generally prepares his ground for a crop of grain, along with which he sows his grass-seed as a secondary object, leaving the young tendril to be over-shadowed for a summer by the more sturdy favourite.

The regular continuation of grass *by seed*, I fancy, has never been steadily practised. Hence no improvement of the species, which, of course, remains as it came from the hand of Nature.

A little attention to the natural history of the grassy tribe, *collectively*, will soon discover the cause why this branch of the agricultural department has been attended to with less care, and cultivated with less success than, perhaps, any other part of that useful science.

The esculent grains are all annuals; they require attention and protection but for a short period, being of rapid growth and soon able to contend to advantage with most of their rivals; while the few of the coarser sorts that remain are soon weeded out, and the ground left to the exclusive possession of the grain that was sown.

With grass the case is, in every respect, different: It is of slow growth—long very diminutive—never coming to perfection (that is, ripening its seed) the first year—indistinguishable
from

from rival grasses which Nature invariably sows along with it; and likely to be soon choaked by rising weeds which, being mostly annuals and of rapid growth, soon overpower it.

When we attempt to obtain a crop of any one grass by itself, we find the trouble of weeding and keeping it distinct from other grasses sufficiently great, even in the experimentalist's diminutive plots; on a large scale it could not be encountered.

The Farmer, therefore, has the alternative, either of sowing his grass by itself in spring, and, when necessary, weeding (as we call it) with the scythe, repeated mowing being fatal to weeds, while young grass, though certainly injured by the operation, is never destroyed—

OR, he must sow his grass-seed with his grain, by way of protection; and this mode he generally prefers, as, by the former, he loses a year's produce.

From these difficulties and impediments it follows, that the agriculturist (at least in my country) generally relies upon Nature for clothing his ground, rarely troubling himself to inquire what are the grasses that rise spontaneously, or to consider whether it would not be more for his interest to sow better kinds.

Let us then, before we have recourse to experience, try the question, *a priori*; let us endeavour to get a lesson from Nature herself, and, by watching her steps, find out what seem to be her favourite grasses, and what species she is most ready
to

to bring forward when the agriculturist has cleared the way for her, by leaving his surface unoccupied.

It is probable that, among these spontaneous obtrusions of Nature obviously indigenous to our soil, we shall be able to select those which it will be the interest of the farmer to cultivate, and which are most likely to repay his labours.

In pursuit of this object, I have for some years been in the habit of carefully examining, through the spring, my fields that I had ploughed the preceding year, watching the spontaneous grasses as they appeared, selecting the most promising, those

Quæ læta et fortia surgunt,

and carefully transplanting them into plots prepared for the purpose.

I had thus an opportunity, when by their panicles they shewed their species, of ascertaining the respective qualities and comparative merits of the grasses that seemed indigenous to our soil.

I then formed distinct plots for each species, and, by letting their crops ripen, was enabled to judge of their value for the purpose of hay, and, when regularly mowed, the luxuriance of the *aftergrass* of each.

Not secure that the powers of regeneration would be exactly the same when kept down by repeated brousing in an early stage, and when mowed but *once* in a state of ripeness, pressed other plots of the same varieties with the scythe, as often as it would catch their sole; and, from the number of
times

times they could each bear to be mowed, conceived I could estimate their powers of regeneration upon which their value, for the purpose of grazing, must greatly depend.

Nor did I confine my inquiries and experiments to the grasses I discovered myself; but when I read or heard of a grass supposed to be valuable, I exerted myself to procure some of its seed, formed plots of it, and subjected it to the same experiments; as also any other grasses which I found growing spontaneously in meadows or sequestered places inaccessible to cattle, and which, though not so obtrusive as the first description, yet seemed to hold out some reasonable prospect of value.

The result of my observations for four or five years, I shall now lay before the ROYAL IRISH ACADEMY; hoping the importance of the subject will compensate for its apparent want of dignity, and that an epitome of every thing I have discovered, or have been able to collect in the grass department, that can be of use to the practical farmer, will be received with indulgence.

I shall commence by enumerating the grasses I find occupying my collectaneous plots, into which I had transplanted them before I knew their species:

Of these, the *Dactylis glomerata* was the most vigorous, and would have been more numerous had I not learned to distinguish them in an early stage by their crimped leaf.

The *Holcus lunatus* comes next, and was always luxuriant; then the *Lolium perenne*, very numerous; the *Poa trivialis*,
equally

equally abundant ; several of the *Anthoxanthum odoratum* ; a few of the *Cynosurus cristatus* ; and, as April advanced, the *Agrostis stolonifera*, our Irish *Fiorin*, had contributed many.

The following grasses were not so obtrusive, yet obviously indigenous to our soil, as I find them in all our natural meadows ; the *Festuca pratensis* seemed the most common ; next the *Avena flavescens* ; then the *Poa pratensis* ; after these came the *Alopecurus pratensis* ; then the *Phleum pratense*—these two, and especially the last, more rarely.

To these twelve grasses I have long paid particular attention, giving each of them several distinct plots, that I might subject them to different experiments. The judgment I formed of their respective qualities and comparative merits, from the result of these experiments, I shall now proceed to detail, arranging them in the order they seem to me to be entitled to according to their several values.

AGROSTIS STOLONIFERA.

1st. I should commence with this grass, admitted to be our *Irish Fiorin*, which I considered as far more valuable than any other grass ; and I persist in this opinion, notwithstanding the recent condemnation of it by Mr. ARTHUR YOUNG, who stigmatizes it with the opprobrious name of *Red Robbin* ; pronouncing peremptorily, that “ All kinds of cattle would starve, rather than touch its herbage.”

Now, one reason, among many others, induces me to persist

sist in extending its propagation myself, and in recommending its cultivation to others, which is *the decided preference given by my horses, sheep, and cows to it, whether green or in hay, above all other grasses.*

But I have of late so fully detailed the curious properties and valuable qualities of this native grass of ours, in different essays on the subject, that I shall not enter into a repetition of what I have already published, but proceed to the grass I consider as next in value, the

II. DACTYLIS GLOMERATA.

By placing our common *Cocksfoot* so high in rank, I shall excite surprise; for though this grass be mentioned respectfully by some writers, yet I do not recollect any of them that recommend its cultivation, nor did I ever hear of its being sown for use; I do not even find its name in any of the random mixtures that agricultural book-makers are so fond of giving us.

When we examine the question *a priori*, we shall find the chief qualities that give value to a grass are three—*earliness*, *quantity* of produce, and *powers* of regeneration when cut or eaten down.

Therefore, in establishing the value of what I may almost call a *new grass*, it is necessary to inquire how it stands, when examined with a view to each of these points separately.

As to earliness, the *Cocksfoot* is, in sward, on a footing with

our most forward grasses. Its panicles come out one day after the *Rye Grass*, and eight or nine after the *Alopecurus*; yet it is ready for mowing before either of them, as it must be cut in an early stage of its inflorescence, when I found it made good hay and fragrant also, though unmixed with the *Anthoxanthum Odoratum*.

The next point of view in which the comparative merits of grasses are to be tried, is *quantity of produce*. Here simple inspection enables us to pronounce the *Dactylis* to be the most luxuriant of our grasses.

Another point of comparison remains, of great importance in meadow grasses, but of infinitely more when they are used for grazing. I mean *powers of reproduction*, when cut or eaten down.

In meadows, this is readily decided by inspection, for the pale green leaves of the *Cocksfoot* are easily distinguished from the others, and soon attain double their length after being mowed. The great fleece of after grass we observe in gentlemen's pleasure grounds is generally composed of *Dactylis*; for here, cattle being excluded, it is permitted to exert its full powers of reproduction.

From this observation which we make in pleasure-grounds not broken up for very many years, we can pronounce upon another important quality, that of holding long possession of the ground: since it appears that the *Cocksfoot*, though originally spontaneous, is able to contend for the possession with advantage, against its perpetually obtruding competitors.

The

The great powers of reproduction possessed by the *Dactylis* are not confined to one cutting only. I have ascertained that this grass stands repeated mowing very nearly as well as the *Alopecurus*, and somewhat better than the *Festuca pratensis*. Now these three regenerate oftener than any other grasses with which I am acquainted.

It is more difficult to determine the comparative value of grasses in pasture than in meadow; for the cattle destroy the distinctive marks; and, in a uniform sole, we cannot tell which of the grasses composing it, contributes most to the sustenance of the stock.

Here again we must speculate *a priori*; and, from our previous knowledge of the qualities of the several grasses, conjecture at their comparative value, when used in pasture.

Having, therefore, proved that *earliness*, *luxuriance*, and *powers of reproduction* are possessed by the *Cocksfoot*, I know no other questions to be asked but—Is it nutritive? and, Are cattle fond of this grass?

The first question cannot be answered until we shall have carried our agricultural exertions and attention so far as to give to separate fields distinct and exclusive crops of our favourite grasses.

Nor is it easy to decide upon the fondness of cattle for a grass never cultivated separate from others; yet I think I can give a presumptive proof that cattle eat the *Cocksfoot* indiscriminately, and, at least, shew no dislike to it.

It is fifteen years since any part of my lawn has been broken

up, while parts of it have been under grass for twenty-two, and others, for thirty years; during all the latter part of which time it had been fed upon by sheep.

My desire to know what species of grasses occupied a sole of so long standing, induced me, two years ago, to let my lawn run to meadow.

When the panicles began to shew, I found *Dactylis* in abundance in all parts of the ground; and, soon after it was mowed, I found the pale leaves of this grass, as usual, outstripping the others every where.

Now, as I had never observed a panicle of *Dactylis* in my lawn, when in pasture, among the brown stems of the *Cynosurus cristatus* (always rejected by cattle) which disfigure our fields so much, nor could distinguish the *Dactylis* by its crimped leaf or any other marks, we have demonstration that it was consumed equally with my other grasses; and since its *earliness*, *luxuriance*, and strong *powers of reproduction*, are already fully established, we cannot doubt that, while the lawn was pastured, the *Dactylis* contributed more largely than any other to the maintenance of my stock.

The excellence of this grass is well known in AMERICA, where it is distinguished by the same name given to it in some parts of England, *Orchard Grass*, an apposite name, as it bears the shade of trees better than any other grass except the *Irish Fiorin*.

III. FESTUCA

III. FESTUCA PRATENSIS.

The next grass in order of value, I imagine, is the *Festuca pratensis*. In strength and luxuriance, it much resembles the *Dactylis*, but it is full three weeks later; yet its powers of reproduction are so great that its aftermath is most abundant; and it seems by no means so soft as that of the *Alopecurus*, or even *Dactylis*, neither collapsing, like the former, when left long on the ground, nor embrowning so soon as the latter.

This grass is so strong, that its hay is coarse, unless it be mowed like the *Dactylis* in an early stage of its inflorescence; so that, where hay is the primary object, a crop of seed must be given up; but, as this *Festuca* produces much seed, a small portion set apart would supply the farmer with seed in abundance.

The *Festuca pratensis* holds possession of the ground strongly. I have still, after standing seven years, an exclusive crop of it, with very little weeding.

IV. ALOPECURUS PRATENSIS.

It may excite surprise that I have not yet mentioned *Fox-tail*, (*Alopecurus pratensis*) generally esteemed our most valuable grass. I myself once entertained a very high opinion of it, and paid particular attention to it.

Even still, for the purpose of grazing, I think it equal, perhaps superior to any other; for, in earliness and powers of reproduction,

reproduction, the *Alopecurus* is rather superior to the *Dactylis*; and though its sward be not quite so luxuriant, yet it is far more delicate.

Three years ago I had stated, that both CURTIS and DICKSON had called this grass too coarse, but that I had found it rather fine, and too much disposed to lodge.

Attentive observation of its sward, and repeated experiments upon its hay, have convinced me that, notwithstanding its high reputation and *characteristic name*, yet that the meadow *Foxtail* is unfit for *hay*.

Its seed stems bearing the panicle, are tall and very few, so as to bear no proportion to the immense mass of soft root-leaf of which its hay will be composed; but it is well known that the nutritious and saccharine parts of our hay are confined almost exclusively to the stem, while the soft root-leaf, little better than a caput mortuum when dry, shrinks, withers, and wastes almost to nothing, in the operation of hay-making.

As I advanced from theory to practice, from my diminutive experimentalists plots to more extended portions of my farm, I endeavoured to save and keep distinct, exclusive parcels from each species of grass of which I entertained good expectations.

I was much shocked to find, when I examined my parcels after some interval, that my *Foxtail* hay was quite soft and greatly collapsed. Heavy rains came on soon afterwards; and, as my parcels were small, I had considerable difficulty in saving any of them, but I succeeded with them all except the
Alopecurus

Alopecurus, which, on July 26th, was quite rotten and thrown on the dung-hill.

V. LOLLIIUM PERENNE.

Rye-grass has been always more esteemed by others than by me, yet of late it has risen greatly in my opinion.

The good qualities of this grass are, that it is very early, and its hay-crop *exclusively stalk*; whence, no doubt, it comes that Rye-grass hay is believed to be more nutritious than any other grass.

This received opinion is strongly confirmed by my friend, GENERAL TROTTER, Commandant in Charlemont, who assures me that his Artillery horses thrive better while the *Rye-grass* hay lasts, but, when it is expended, he can perceive a change.

The *Lolium perenne* holds a steadier possession of the ground than any grass I know, and from every observation I can make, seems more indigenous to our Irish soil than any other.

I form this judgment of the *Rye-grass* both from my finding it so frequently in my collectaneous plots, and also from my finding it more abundant than any other grass in my lawn, when turned to meadow, after being pastured from fifteen to thirty years.

On the other hand, the crop of *Rye-grass* is very thin, and its aftermath light and poor; nor are its earlier powers of reproduction

production nearly equal to those of the *Dactylis* and *Alopecurus*; for my *Rye-grass* would not catch the scythe a second time, before June 21st, while the other two were equally forward a third time on the 26th: whence, and also from its thinness, I consider *Rye-grass* as very unprofitable for pasture, though the superior quality of its hay may compensate for the defect in quantity.

VI. *HOLCUS LANATUS*.

Of this grass, commonly called *White Grass*, I have always entertained a better opinion than I generally find expressed in our agricultural books. Some of the best crops my experimental plots have produced were of *Holcus lanatus*.

It is not so late as the *Festuca pratensis*, and its powers of reproduction, though inferior to those of the *Alopecurus* and *Dactylis*, are by no means deficient.

The *White Grass* is decidedly indigenous to our soil, and among our most obtrusive grasses, yet it is in some respects very delicate. Its seed always failed with me when sown after August 29th; and I once absolutely lost, and, on another occasion, materially injured crops of *Holcus lanatus*, by mowing their after-grass in December, while my *Alopecurus*, *Dactylis*, and *Festuca*, have been mowed for seven years, at the same season, without sustaining any injury.

VII. *POA*

VII. POA PRATENSIS.

I now proceed to the *smooth stalked meadow grass*, universally well spoken of, and in many respects deservedly; its soil shews the first verdure in spring, just before the *alopecurus*, but the latter outstrips it and covers the ground with a more luxuriant sward.

The *Poa pratensis* is by no means deficient in any of the qualities I have stated, as essential to the value of the grass; its aftergrass is good, it regenerates quickly, and the sole seems close and kindly.

This does not appear to be an obtrusive grass, as I never found a single root in any collectaneous plots, yet it is obviously indigenous, as I find it in abundance in all my natural meadows, especially in dry ground.

VIII. AVENA FLAVESCENS.

I once recommended this grass strongly, as producing a nicer sward for hay than any other grass, it looks better even than the rye grass, the stalk not quite so wiry, and two or three short leaves on each stalk give it a very rich appearance; the stalks too are more abundant than those of the rye grass.

Still the *Avena flavescens* is deficient in two very important points; it is much later than I once imagined, and it is totally deficient in after grass.

Notwithstanding the *Poa pratensis* and *Avena flavescens*, more especially the former, possess some very good qualities ; I decline recommending *either*, as they are both deficient in a property of much importance to the farmer, who means, when he lays down his ground, not to break it up for some years.

Neither of these grasses hold long possession of the ground ; with all the powerful aid I gave them, they were scarcely able to retain their hold of it, and without my interference, by frequently weeding out their competitors, it was plain that they would soon have disappeared.

IX. PLEUM PRATENSE.

Timothy grass is sometimes recommended for producing a strong and valuable crop of hay, as I have repeatedly found myself when I cut it early in its inflorescence, this is absolutely necessary from its great coarseness.

Yet I think a crop of this grass by no means compensates for its *lateness* and total want of after-grass, its powers of re-production being inferior to those of any other grass, or rather none at all, for, after mowing, it makes no more attempt to rise again than a crop of corn, indeed it seems to resemble the grain more than the grass tribe.

Timothy grass is very common in AMERICA, and said with us to be a foreign grass, yet I have seen it in meadows where it could not have been sown ; it obviously is not a
grass

grass for our moist country, while we have several others in a state of perpetual vegetation ; perhaps in a warmer climate a valuable crop of it might be forced up before the great droughts set in.

I once conceived the *Pleum pratense* held long possession of its ground, because I found many stalks of it where I had sowed it ten years before, but on more careful examination I perceived it merely *existed*, scarcely contributing to the meadow crop.

For these reasons I have long declined cultivating Timothy grass and cannot recommend it.

X. BROMUS MOLLIS.

This is one of the most common and obtrusive grasses we have, it is known to farmers by the name of *goose grass*, its panicle resembles a head of oats.

The *Bromus mollis* gives a very early and luxuriant crop of hay, it must be cut like other strong grasses, while in flower, or it becomes too coarse, its after-grass is not deficient, but unfortunately this grass is *an annual*, as the unexperienced farmer often discovers to his cost, when after exulting in a magnificent crop of hay, he next year cannot find a single stalk of his admired Brome grass.

Even under this disadvantage, one valuable property of this grass enables us to make use of it on some occasions,

which is, that the *Bromus mollis* produces an abundant crop of the most prolific and hardy seed I know.

It is the only grass seed I have tried which will grow after a potatoe crop; when we sow other grasses, even in September, though they should vegetate for a while, yet the first sharp frost destroys the young tendril, while the bromus does not sustain the slightest injury.

Hence in laying down our grounds with grass, when the seed we have selected to clothe our ground with fails, either totally or partially, the hardy bromus will supply its place, and if the patches of naked stubbles be slightly loosened even with a rake or harrow, and this seed sown, the farmer will still have good meadow the ensuing year, and in the one following, though the *bromus* be gone, we never fail to find the sole well covered.

My friend, the Honourable and Reverend Charles Knox, has devised a mode of turning this grass to profit, which *a priori* seems very plausible.

Residing in a blake and rather a wild country, good hay is not easily procured, and oats are an article of prime necessity; thus circumstanced, Mr. Knox proposes to sow *bromus mollis* with his oats, and the year following to mow its crop for hay; secure also of an abundant *aftermath*.

The third year he recommences the same routine, thus securing the two articles he stands most in need of, and avoiding a too severe pressure upon his ground, he exactly follows VIRGIL's directions.

Alternis

Alternis item tonsas cessare novales
Et segnem patiere situ durescere campum.

Should the *Bromus mollis* turn out an improving crop, the practice must prove an admirable one; at all events, the experiment is well worth trying.

XI. FESTUCA FLUITANS.

I proceed to the *Festuca fluitans*, a grass possessing some excellent qualities, yet I must confess I have not hitherto been able to avail myself of them.

It is known sometimes by the name of *drain grass*, and is to be found only in the very wettest situations; this is the grass which so often choaks and closes up our drains by its thick matted strings and stolones; it converts shallow waters into green morasses, and is the principal agent in the formation of the rich alluvial soil we find upon draining such morasses, and also in the frequently overflowed meadows contiguous to languid rivers.

Cows and horses are remarkably fond of the *Festuca fluitans*, children call it *honey grass* from a gluey saccharine matter that exudes through the leaves and adheres to their surface, they draw this across their tongues to catch the sweet.

I tried to make hay of it, but the sward from the scythe was so succulent and soft that it soon collapsed and could not be saved like other grass.

In

In winter its powers of vegetation are very great; on the 1st. of December, a little boy of mine stole the whole crop from my irrigated plot for his rabbits, yet by the first of March the plot had recovered a fleece; I know not any other grass that could have made such an effort.

However desirable so rich a green food might be deemed in that ungenial season, the places where the *Festuca fluitans* is found, are generally so flooded in winter, as to make its crop inaccessible, and were we to transfer it to our irrigated grounds, from which we can occasionally let off the water, we shall find few of them able to afford a sufficient supply in summer to this most decided aquatic.

From these difficulties I have given up the cultivation of this excellent grass; I state its good qualities, hoping that others may exert their ingenuity with more success.

XII. FESTUCA OVINA.

I cannot avoid saying something of this grass of late come into fashion in ENGLAND, but which has not, to my knowledge, been yet cultivated in IRELAND.

I tried the *Festuca ovina* for two years, but in the third, though I assisted it by weeding, yet it lost possession of its plot.

The panicles of this grass are few and low, neither these nor the sward ever rising so high as to catch the scythe, of course the *Festuca ovina* can only be used in pasture, and then
its

its value must depend much on its powers of regeneration, which I suspect have never been tried or observed with attention.

Not considering my trial of this grass sufficient, I wished to know it better, and wrote to England for some seed, but was informed it was all gone, being sold off at a guinea a bushel; I should have thought it very difficult to collect even one bushel from such diminutive and thinly scattered panicles.

The *Festuca ovina* as appears upon simple inspection, and as is announced by its name, is a grass fit for sheep exclusively, of course must be sowed in extensive tracts, and an immense quantity therefore of seed will be required, for it would be extreme folly to mix it with other grass seed, and thus overpower by the introduction of stronger competitors a diminutive plant, which I was not able to protect from the coarser grasses and weeds that obtruded themselves spontaneously.

I speak with less confidence of the *Festuca ovina* than of any other grass; my experiments upon it having been more curtailed; nor does it afford opportunity for observation in its natural state; I suspect, indeed, that it never has been studied with that degree of patience and attention that would justify the pronouncing positively upon its merits; the advocates for this grass would do well to give it a cool and fair trial; my condemnation of it is founded on speculation *a priori*.

I have

I have now enumerated all the grasses with which I am acquainted, that hold out any reasonable probability of repaying the labour and expence of cultivation. I have included a few, from which I have but slight hopes; yet as these also have their partizans, I have brought them forward, chusing to leaving the question relative to their merits open for further examination and future experiment.

I proceed to some other species of grass often recommended as valuable in modern agricultural books, but of which I entertain a different opinion, and upon these having had ample opportunity for experiment and observation, I shall venture to pronounce a condemnation without hesitation.

XIII. POA TRIVIALIS

I commence with the *rough stalked meadow grass*, to which I have paid more attention than to any other grass, seduced by the plausible appearances it often held out.

For instance, lively and luxuriant tufts in my collectitious plots, which I have already mentioned, frequently prove *Poa trivialis*—our rich moist bottoms are full of its panicles in their season—the thick and almost indistinguishable mass thrown up by irrigating a natural sole, shews more vigorous panicles of *Poa trivialis* than of any other grass. In raw grounds I have found its little spontaneous tufts stool, and enlarge to a diameter of eight or nine inches, by sending
out

out horizontal shoots with two diverging points like the antenna of an insect.

Yet, from these promising verdant sods, not a single blade arises which cattle could bite. Towards June, a croud of hungry hair like panicles arise, forming wretched meadows, and fit for nothing else; as to after-grass, the *Poa trivialis* never makes the slightest attempt to throw up any.

For seven or eight years I have never been without distinct plots of this grass, which shew a miserable contrast with other (even the condemned) grasses; I have tried *root* and *seed* plots of it under irrigation, without success, though here I expected much from it; but I have already said too much on the subject of a grass that does not possess a single good quality which I have been able to discover.

XIV. CYNOSURUS CRISTATUS.

Of the *Crested dog's tail* I shall say little, satisfied with what is admitted by one of the writers, who throws a portion of its seed into the mixture he recommends to farmers.

This gentleman admits that the *Cynosurus cristatus* has little blade—that its seed stalks are too hard for cattle—that it has scarcely any after-grass; he should have told what are the qualities for which he recommends it.

That he has given a fair character of the *Crested dog's tail*, I have proved by repeated experiments; in the North of Ireland, we know its panicles but too well, under the name

of *windle straws*. I attempted to force this grass, by manure, into something better, but the result was, that I made its stalk absolutely ligneous.

XV. ANTHOXANTHUM ODORATUM.

Sweet scented meadow grass—supposed to be that which gives fragrance to our newly cut hay ; no doubt it has a very sweet smell, but neither this quality, nor its earliness, for its panicle appears ten or twelve days before any other of our indigenous grasses, compensate for the miserable thinness of its crop, the want of luxuriance in its blade, and its total deficiency in after-grass.

POA ANNUA.

A most obtrusive little reptile, rapidly attaining its dwarfish maturity, and soon throwing out its stunted panicles ; these it seems to produce every month in the year, except January.

This grass is so low and flat, that cattle can reach nothing but these panicles ; yet as the *Poa annua* omits *stolones*, it soon occupies much of a raw surface ; but it seems unable in a thick sole, to contend with the stronger grasses. With astonishment I have seen a premium offered for saving the seed of this grass.

I have now gone over the list of *all* the grasses, which, from my researches and experiments, I judge to deserve the
attention

attention of the agriculturist; I have repeatedly given distinct plots in my garden to each of these, and also many other grasses which I do not see any use in bringing notice upon; every one of the former, and also several of the latter, I have tried in my farm, on a larger scale, and I likewise have observed them carefully in their natural state, whether emerging from a raw and naked surface, or crowded together in a green sole, or in the thick sward of a meadow.

I have also paid the same attention to the four concluding grasses, which I venture to condemn, feeling it necessary to be sure of my ground before I hazarded an opinion different from that of so many writers on the subject.

I do not presume to say that I have enumerated *all* the grasses worthy of cultivation; but merely those with which I have been able to make myself acquainted.

Who can tell what Nature may have yet in store for us, even in our own country? or what discoveries a watchful attention to the subject may make? I myself am vain of having brought into notice a neglected grass of our own, which proves to be of superlative value.

Until further additions shall be made to our stock of grasses, let us endeavour to improve our knowledge of those we have, that we may apply them to use, in such manner as will enable us to derive the greatest advantage from the qualities with which Nature has endowed them.

I have hitherto attempted to trace the natural history and properties of our several grasses taken singly; I shall now

examine them *collectively*, whether mixed by Nature according to her irresistible propensity; or thrown together by Man judging *a priori* what mixture of seed will afford the most valuable produce.

The separate values of our most common indigenous grasses being ascertained, we are enabled to form a pretty good estimate of the value of the *compound* formed by their mixture; for it is not likely that an individual grass will carry into that compound, any qualities which it did not possess in its solitary state.

I shall commence with the mixtures formed by Nature, and examine what are the grasses with which, by her own effort, she generally clothes our surface; or in other words, forms a *sole* upon ground she shortly before had found naked.

Should these obtrusive grasses appear to be of valuable kinds, Man has no occasion to interfere, Nature does his whole business herself; and when he shall have taken from his ground as many crops as he thinks it will bear, he has only to leave it to Nature, and she will restore a verdant and productive surface.

Should, on the other hand, the grasses most ready to obtrude themselves, and outstrip the others in taking possession of our vacant surface, appear to be of inferior quality and scanty produce, when taken individually, the agriculturist, if he be wise, will interfere, and in his turn outstrip these

these paltry intruders, and give an antecedent possession to more esteemed grasses, by carefully sowing their seed.

The grasses that seem most forward to occupy and clothe our surface, I invariably find to be, the *Poa trivialis*, and the *Poa annua*; the *Agrostis stolonifera* (our Fiorin) no doubt points up diminutive shoots before either of them, and already (January 20th.) they are beginning to appear; but this grass is of itself utterly unable to contend for possession without the aid of Man, or some process like irrigation, injurious to its competitors; without these it barely preserves its existence.

The *Anthoxanthum* appears to come next, then the *Cynosurus cristatus*, the *Lolium perenne* (Rye Grass) seems the most obtrusive of our valuable grasses, and appears in abundance; but even when we attempt to give *Rye Grass* exclusive possession, by sowing its seed, it forms a very poor sole, while the *Holcus lanatus* and *Dactylis glomerata* rising in strong solitary tufts rather disturb than improve the sole.

Thus we find that the four grasses most likely to obtrude themselves, are the very four which I have assigned my reasons for condemning; yet notwithstanding their want of value, and the *certainty* that we shall have them, whether we sow them or not; some, or most of them are found in every mixture I meet with recommended to farmers in agricultural books.

The agriculturist must now determine for himself, whether he will lay down his ground with *one* favourite grass exclusively;

clusively; or in imitation of Nature he will mix *several varieties*.

Should meadow be his primary object, there can be little doubt it is better for him to limit himself to *one* species, because there is a certain period in the growth of every grass (its state of inflorescence) at which it attains its highest perfection, and of course should be mowed at that time; but if we mix seed, as the season of this *Acme* varies much in the different grasses, we must mow when some of them have not attained, and others are past their most valuable state.

Yet I am confident that by a careful attention to these periods, and an accurate knowledge of the natural history of each grass, its excellencies and its defects; a few mixtures may be devised, in which the redundant qualities of one grass might supply the deficiencies of another; so that the *compound* would be more valuable than either separately, by possessing the best properties of each, and at the season of their mutual perfection.

Upon these principles I shall venture to recommend two or three mixtures which I believe have not occurred to any one before.

The first is *Dactylis* with *Lolium perenne* (Rye Grass), the former shews the panicles one day later than the latter, and it comes into flower about four days later; the periods are thus sufficiently near, and the earliest is that which can afford to stand longest.

The

The immense sward of the *Dactylis* abounding with leaf, and rather soft stalks, must be corrected and improved by the wiry stalks of the Rye Grass, superior in quality, but very deficient in quantity ; a meadow from this mixture should be mowed (*communibus annis*) about June 14th.

A great benefit from this mixture would be found in the after-grass, the strong powers of regeneration possessed by the *Dactylis*, would abundantly compensate for the languid after-growth of the *Rye Grass*.

The next mixture I suggest—*Rye Grass* with *Alopecurus pratensis*—is founded nearly on the same principles, the *Foxtail* flowers eleven days before the *Rye Grass*; but its stalks bear so small a proportion to its leafy sward, that there will be little loss in keeping it waiting until the other comes to full perfection, and the extreme softness of the leafy produce of the *Foxtail*, will be better corrected by suffering the *Rye Grass* stalks to become harder; I therefore would not mow this meadow until June 21st.

The same reasons hold as in the former case, with respect to after-grass ; I can devise no other mode of making the soft, though luxuriant, sward of my quondam favourite *Foxtail* into hay that would be fit for use.

In the next mixture that occurs to me, *Rye Grass* with *Festuca pratensis*, the periods of inflorescence differ still more, the *Festuca* being about 16 days later than the other, but the coarseness of this grass making it necessary to cut it as soon as the flower appears, and as it is then, of course, rather
soft,

soft, I conceive the hay would be improved by letting the stalks of the Rye Grass acquire somewhat more hardness than in either of the former cases ; the arguments from after-grass the same as before.

I am sorry to say, that in recommending these mixtures, I am speculating *a priori*; I twice tried them in experiment, and each time failed ; first the Rye Grass seed happened to be bad, and did not come up again ; I was overpowered by a mixture of *Bromus mollis*, which somehow obtruded itself and disabled me from forming any judgment on the success of the experiment.

I must also speculate *a priori* on another very important subject ; the selection of the grasses best adapted to *grazing farms*, should the agriculturist, when laying down his ground, look forward to pasture as his primary object.

Here, too, as well as in his meadows, he will find the advantage of anticipating Nature, and pre-occupying his grounds with the grasses most likely to answer his purpose.

In the selection of these he cannot be long in doubt, which to prepare ; *earliness*, *luxuriance*, and quick powers of *regeneration* when cut, or eaten down, being the chief qualities he requires.

Now in each of these *separately*, the *Dactylis* and *Alopecurus* excel all other grasses ; and I am confident a mixture of the two would succeed well, as the delicate blade of the *Foxtail* would correct the coarseness of the *Cocksfoot*.

The

The *Festuca pratensis* seems to come next in value; this grass, no doubt, fails in earliness, but some amends is made by the excellence of its winter sward, which exhibits a freshness and verdure, superior to either of the others, and bears the severity of weather much better.

These three grasses also possess an advantage of great importance, where grounds are not likely to be broken up for a long time; they seem better able to contend for the possession, and actually hold it longer, than any others I am acquainted with.